

**American Institute of  
Electrical Engineers**



**MIDWEST  
GENERAL  
MEETING**

**Program**

**MILWAUKEE, WISCONSIN  
OCTOBER 18-22  
1948**

**Meeting Headquarters  
SCHROEDER HOTEL**

## GENERAL INFORMATION

This meeting in Milwaukee, Wisconsin, marks the second of the Midwest General Meetings to be held annually each fall. Thirty-four technical sessions and conferences have been scheduled in four broad fields; power, industry, communication and basic sciences. The conferences on industrial control, material handling, and automatic contouring for machine tools are particularly fitting, and the schedule of sessions has been arranged to permit inspection trips to corresponding industries with a minimum of conflict.

**Please register** on arrival at the headquarters in the Schroeder Hotel. To help defray part of the cost of the meeting, a registration fee of \$3.00 will be charged to members; nonmembers, \$5.00. No fee will be charged to Student members and the families of members. Complete your registration on arrival at the meeting by making payment of the fee at that time.

**Information** on all features may be obtained at the registration desk. Efforts will be made to deliver telegrams and messages promptly. Any mail received for members will be held at the registration desk until called for. Letters undelivered at the close of the meeting will be forwarded to the latest mailing address. Please make a regular practice of observing the bulletin boards.

**Technical Sessions and Discussions** are governed by the "Conduct of Technical Sessions" at the discretion of the presiding officer. In so far as possible the order in the program will be followed in each session. Usually 10 minutes will be allowed for the presentation of each paper and 5 minutes for each discussion. To receive consideration for publication, discussions must be left with the chairman or sent to Edward C. Day, AIEE, 33 West 39th Street, New York 18, N. Y., before November 5. The original, typewritten, double spaced copy, complete with original illustrations and two carbon copies with photostats or blueprints, should be submitted.

**Authors and discussers** should make their presentations as effective as possible. Remember the audience. Speak distinctly so as to be heard in the rear of the room. Stress the salient features of the paper which are new or novel, and illustrate the advantages of your methods. When using slides, please turn toward the audience before speaking and raise your voice. Extemporaneous delivery is preferable to reading unless done slowly and emphasis is put in the proper places.

**Advance copies of technical papers** may be purchased by members at the registration desk at the uniform price of 30¢ each (60¢ each to nonmembers). Only numbered papers are available. Conference papers denoted by CP\* are intended for presentation only and are not available. Mail orders, particularly from out of town members, are advisable inasmuch as an adequate supply of each paper at the meeting cannot be assured. Mail orders should be addressed to the AIEE Order Department, 33 West 39th Street, New York 18, N. Y. Most of the papers ultimately will be published as AIEE PROCEEDINGS and in the TRANSACTIONS.

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**SCHEDULE OF EVENTS**

See Separate Schedule for Ladies Program

**Monday, October 18**

- 8:30 a.m. Registration
- 10:00 a.m. Opening General Meeting
- 1:15 p.m. Trip to Port Washington Power Plant
- 1:30 p.m. Trip to Harnischfeger Corporation
- 2:00 p.m. Transformers  
Basic Sciences  
Electric Heating
- 7:30 p.m. Trip to Blatz Brewing Company  
Trip to Pabst Brewing Company  
Trip to Jos. Schlitz Brewing Company

**Tuesday, October 19**

- 9:30 a.m. System Engineering  
Conference on Nuclear Physics  
Mining  
Home Receivers  
Symposium on Circuit Analysis  
Trip to Cutler-Hammer, Inc.  
Board of Directors Meeting—University Club.
- 12:30 p.m. Luncheon at Allis-Chalmers Club House
- 1:15 p.m. Trip to Allis-Chalmers Manufacturing Co.
- 2:00 p.m. System Engineering  
Conference on Ore Beneficiation  
Conference on Television Broadcasting  
Conference on Industrial Control
- 6:30 p.m. Stag Smoker

**Wednesday, October 20**

- 9:30 a.m. Insulated Conductors  
Industrial Control  
Conference on Electric Heating
- 12:30 p.m. Industrial Heating Luncheon
- 1:30 p.m. Trip to Globe-Union, Inc.  
Trip to Square D Company
- 2:00 p.m. Power Generation  
Regulators  
Industrial Power Systems  
Conference on Electric Heating
- 6:30 p.m. Banquet and Dance

**Thursday, October 21**

- 9:30 a.m. Insulator Contamination  
Symposium on Speed Regulating Systems for Sectional  
Paper Machine Drives  
Steel Mills  
Railroad Communications  
Carrier Current  
Trip to A. O. Smith Corporation
- 1:30 p.m. Trip to Allen-Bradley Company
- 2:00 p.m. Transmission, Distribution, and Outdoor Substation  
Design  
Conference on Material Handling  
Land Transportation
- 7:30 p.m. Milwaukee Gemuetlichkeit, Sports, etc.

**Friday, October 22**

- 9:00 a.m. Switchgear
- 9:30 a.m. Conference on Automatic Contouring for Machine Tools  
Switching Systems  
Joint Conference on Education and Student Branches  
Trip to Liquid-Cooled Alternator at Milwaukee School  
of Engineering
- 2:00 p.m. Relays  
Conference on Automatic Contouring for Machine  
Tools—continued  
Radio on Great Lakes

# Program

## Monday, October 18

8:30 a.m.—Registration

10:00 a.m.—Opening General Meeting  
Crystal Ballroom

1:15 p.m.—Trip to Port Washington Power Plant

1:30 p.m.—Trip to Harnischfeger Corporation

2:00 p.m.—Transformers

Crystal Ballroom  
H. B. KEATH, Presiding

48-289. Aging Characteristics of Dry-Type Transformer Insulation at High Temperature. H. C. Stewart, L. C. Whitman, General Electric Company.

48-290. Measuring Transformer Winding Temperatures Continuously with the Transformer Carrying Load. A. M. Lockie, G. M. Stein, Westinghouse Electric Corporation.

48-291. Experience with Transformer Impulse Failure Detection Methods. L. C. Aicher, Jr., Allis-Chalmers Manufacturing Company.

48-292. Voltage Stresses in Distribution Transformers Due to Lightning Currents in Low-Voltage Circuits. K. D. Beardsley, W. A. McMorris, H. C. Stewart, General Electric Company.

2:00 p.m.—Basic Sciences

Banquet Room  
WALTHER RICHTER, Presiding

48-274. Bridge Erosion in Electrical Contacts and Its Prevention. W. G. Pfann, Bell Telephone Laboratories, Inc.

48-275. The Magnetic Properties of Stainless Steels. W. A. Stein, Washington University.

48-276. Proximity Effect Factors for Three-Phase Coaxial Buses Comprised of Square Tubular Conductors. T. J. Higgins, University of Wisconsin; H. P. Messinger, University of Illinois.

48-277. Stabilized Permanent Magnets. P. P. Cioffi, Bell Telephone Laboratories, Inc.

2:00 p.m.—Electric Heating

Pere Marquette Room  
G. W. SCOTT, JR., Presiding

48-286. Ultrahigh-Frequency Antenna Considerations for Radiation ACO. Measurements. H. E. Dinger, G. E. Leavitt, Naval Research Laboratory.

48-287. Mercury-Arc Furnace Converter for Induction Heating of Metals. S. R. Durand, J. B. Rice, Allis-Chalmers Manufacturing Company.

48-247. Industrial Electric Resistance Heating. L. P. Hynes, Hynes Electric Heating Company.

7:30 p.m.—Trip to Blatz Brewing Company  
Trip to Pabst Brewing Company  
Trip to Jos. Schlitz Brewing Company

## Tuesday, October 19

9:30 a.m.—System Engineering  
Crystal Ballroom  
EARLE WILD, Presiding

48-265. Planning the Development of a Large All-Hydro System. ACO.† M. Ward, H. A. Smith, Hydro-Electric Power Commission of Ontario.

48-266. Planning the Development of a Metropolitan Electric System. M. L. Waring, Consolidated Edison Company of New York, Inc.

48-267. Emergency Control of System Loads. J. M. Comly, J. E. McCormack, Consolidated Edison Company of New York, Inc.; C. B. Kelley, T. W. Schroeder, The United Light and Railway Service Company; H. W. Phillips, Pennsylvania-New Jersey Interconnection.

9:30 a.m.—Conference on Nuclear Physics  
Pere Marquette Room  
J. T. WILSON, Presiding

CP\*. Recent Developments in the Design of High Energy Accelerators for Atomic Particles. J. T. Wilson, Allis-Chalmers Manufacturing Company.

9:30 a.m.—Mining  
Club Room  
A. C. MUIR, Presiding

48-269. Evolution of Ward-Leonard Control for Shovels and Draglines. P. S. Stevens, Bucyrus-Erie Company.

48-270. Electric Equipment for Power Shovels and Draglines. W. H. Schwedes, D. Stoetzel, General Electric Company.

CP\*. The Use of Electricity in the Operations of the Calumet and Hecla Consolidated Copper Company. J. E. Breth, Calumet and Hecla Consolidated Copper Company.

CP\*. Main Line Track Haulage in Mines. Phelan McShane, Westinghouse Electric Corp.

9:30 a.m.—Home Receivers  
Banquet Room  
S. C. SPIELMAN, Presiding

48-278. Television Receiving Systems. C. M. Sinnott, Radio Corporation of America.

48-272. FM Receiver Design Trends. G. G. Young, General Electric Company.

CP\*. The Columbia Long Playing Microgroove Recording System. P. C. Goldmark, Columbia Broadcasting System, Inc.

CP\*. Light Weight Pickup Design for Microgroove Records. B. P. Haines, Philco Corporation.

9:30 a.m.—Symposium on Circuit Analysis  
Parlor A  
T. J. HIGGINS, Presiding

CP\*. The History and Present State of the Operational Calculus as Applied in Electric Circuit Analysis. T. J. Higgins, University of Wisconsin.

CP\*. The History and Present State of the Application of Matrix Algebra in Electric Circuit Analysis. Myril Reed, University of Illinois.

CP\*. Circuit Analysis in Servomechanism Theory. C. N. Weygant, University of Pennsylvania.

9:30 a.m.—Board of Directors Meeting—University Club  
9:30 a.m.—Trip to Cutler-Hammer Inc.  
12:30 p.m.—Luncheon at Allis-Chalmers Club House  
1:15 p.m.—Trip to Allis-Chalmers Manufacturing Co.

## Tuesday - con'd.

### 2:00 p.m.—System Engineering

#### Crystal Ballroom

ROBERT BRANDT, Presiding

- 48-268. Continuous Load-Frequency Control for Interconnected Power Systems. H. M. Dimond, G. S. Lunge, General Electric Company.
- CP.\* Report on Questionnaire "Current Status of Load-Frequency Control."
- CP.\* Designing Boiler and Control Equipment for Fluctuating Loads. P. S. Dickey, Bailey Meter Company; P. R. Loughin, Babcock and Wilcox Company.
- CP.\* Effect of Fluctuating Load on Steam Turbines. R. L. Reynolds, Westinghouse Electric Corporation.

### 2:00 p.m.—Conference on Ore Beneficiation

#### Club Room

T. B. MONTGOMERY, Presiding

- CP.\* Introductory Talk on Ore Beneficiation. W. L. Maxson, Oliver Iron Mining Company.
- CP.\* Heavy Media Separation. American Cyanamid Company.
- CP.\* Magnetic Separation. Ding Magnetic Company.
- 48-313. Power Distribution and Utilization in a Large Ore Beneficiation Plant. A. F. Gettelman, General Electric Company.

### 2:00 p.m.—Conference on Television Broadcasting

#### Pere Marquette Room

R. E. SHELBY, Presiding

- 48-273. Progress in Coaxial Telephone and Television Systems. L. G. Abraham, Bell Telephone Laboratories, Inc.
- CP.\* New York to Schenectady Television Relay. F. M. Deerhake, General Electric Company.
- CP.\* Stratovision Broadcasting. C. E. Nobles, Westinghouse Electric Corporation.
- CP.\* Fundamental Design Problems Regarding Television Transmitters. C. E. Hamilton, Allen B. DuMont Laboratories, Inc.
- CP.\* Recent Development in Semiconductors and the Transistor. J. A. Becker, Bell Telephone Laboratories, Inc.

### 2:00 p.m.—Conference on Industrial Control

#### Banquet Room

J. D. LEITCH, Presiding

- CP.\* Thermal Overload Relays for the Protection of Motors Driving High Inertia Loads. R. E. Walters, Allen Bradley Company.
- CP.\* An A-C Operated Magnetically Latched Contactor. L. H. Matthias, Allen Bradley Company.
- CP.\* Inching Control for Large A-C Motors. R. M. Peeples, W. J. Herzinger, Allis-Chalmers Manufacturing Company.
- CP.\* The Application of Regulex to Improve Steady State Stability. J. F. Sellers, L. T. Rosenberg, T. B. Montgomery, Allis-Chalmers Manufacturing Company.
- CP.\* Automatic Power Factor Control on Synchronous Motors. T. H. Bloodworth, L. T. Rosenberg, Allis-Chalmers Manufacturing Company.

### 6:30 p.m.—Stag Smoker

## Wednesday, October 20

### 9:30 a.m.—Insulated Conductors

#### Crystal Ballroom

L. F. HICKERNELL, Presiding

- 48-253. Polyethylene Insulated Coaxial Cable for Carrier Current Control Circuit. H. B. Slade, The Okonite Company; F. P. West, Consolidated Edison Company of New York, Inc.
- 48-249. Problems in the Measurement of A-C Resistance and Reactance of Large Conductors. E. H. Salter, Electrical Testing Laboratories, Inc.
- 48-254. A-C Resistance of Large Size Conductors in Steel Pipe or Conduit. R. J. Wiseman, Chairman of IPCEA Committee.
- 48-252. Reactance of Large Cables in Steel Pipe or Conduit. W. A. Del Mar, Phelps Dodge Copper Products Company.

### 9:30 a.m.—Industrial Control

#### Banquet Room

J. D. LEITCH, Presiding

- 48-283. Application of Low Frequency to Industrial Control Problems. N. L. Schmitz, Cutler-Hammer, Inc.
- 48-284. Dynamic Lowering D-C Hoist Control. D. L. Pettit, Square D Company.
- CP.\* Some Machine Tool Electrical Control Applications. Leonard Hesse, Gisholt Machine Company.
- CP.\* Safety in Machine Tool Control. D. K. Frost, Mattison Machine Works.
- 48-279. The Characteristics and Application of Precision, Snap-Acting Switches. A. L. Riche, First Industrial Corporation. Demonstration.

### 9:30 a.m.—Conference on Electric Heating

#### Pere Marquette Room

J. C. HANDY, Presiding

- CP.\* Determination of Heat Requirements. Mark M. Greer, Edw. L. Wiegand Co.
- CP.\* Application of Electric Heating Units for Surface Heating. C. R. Hanna, General Electric Company.
- CP.\* Electrical Heating of Fluids. Lee P. Hynes, Hynes Elec. Heating Company.
- CP.\* Application of Electric Heating Units for High-Velocity Air Heating for Processing Materials. R. J. Ruff, Young Brothers Company.
- CP.\* Review of Developments in Controlled Atmosphere Electric Furnaces. C. E. Peck, Westinghouse Elec. Corporation.

### 12:30 p.m.—Industrial Heating Luncheon

### 1:30 p.m.—Trip to Globe-Union, Inc.

Trip to Square D Company

### 2:00 p.m.—Power Generation

#### Crystal Ballroom

J. B. McCLURE, Presiding

- 48-280. Speed Governing Design Considerations for Multi-Valve Condensing Steam Turbine Generators. J. W. Barnett, General Electric Company.
- 48-281. Preliminary Consideration of System-Wide Load Division by Means of Accurate Time Control. T. E. Curtis, W. M. Pickslay, Pacific Gas and Electric Company.

## Wednesday - cont'd.

48-282. Performance Characteristics of Speed Governors on Automatic  
ACO.† Extraction Turbines Driving Electric Generators. L. B. Wales,  
General Electric Company.

CP\* Hydraulic Model of a Liquid-Cooled Turbo-Alternator Rotor.  
Carl J. Fechheimer, Consulting Engineer.

### 2:00 p.m.—Regulators

Banquet Room  
J. E. CLEM, Presiding

48-177. Feeder Voltage Regulator Accuracy Standards. W. E. Birchard,  
General Electric Company.

48-261. Proposed Test Code for Feeder Voltage Regulators. Working  
ACO.† Group of ASA C57 Test Code Subcommittee.

48-263. Feeder Voltage Regulator Application on Power Systems.  
J. N. Gosinski, J. R. Oberholtzer, Commonwealth and Southern  
Corporation.

48-264. Power System Voltage Control without Feeder Voltage Regu-  
lators. N. N. Smeloff, Pennsylvania Power and Light Company.

### 2:00 p.m.—Industrial Power Systems

Club Room  
D. L. BEEMAN, Presiding

48-293. Dummy Loads Applied to Large Industrial Welders to Reduce  
ACO.† Voltage Fluctuations. A. W. Brown, S. E. Johnson, Illinois  
Northern Utilities Company.

48-294. Flexible Power System for Rapidly Expanded Heavy Manu-  
ACO.† facturing Plant. H. J. Decker, General Motors Corporation.

CP\* An Industrial Electrical Distribution System Designed around  
War Surplus Electrical Equipment. Nelson Kieb, Albert Kahn  
Associated Architects and Engineers.

### 2:00 p.m.—Conference on Electric Heating

Pere Marquette Room  
J. C. HANDY, Presiding

CP\* The Resistance Furnace in The Non-Ferrous Metal Industry.  
E. H. Scheick, American Smelting & Refining Company.

CP\* Radiant Heating. H. J. Garber, University of Tennessee.

CP\* Induction Heating. W. C. Rudd, Induction Heating Corpora-  
tion.

CP\* Dielectric Heating. W. H. Hickok, T. L. Wilson, Girdler  
Corporation.

CP\* Some Economic Aspects of Radio-Frequency Heating. L. M.  
Duryee, Connecticut Light & Power Company.

### 6:30 p.m.—Banquet and Dance

## Thursday, October 21

### 9:30 a.m.—Insulator Contamination

Crystal Ballroom  
C. F. WAGNER, Presiding

48-307. Flashovers of Suspension Insulators Due to Contamination.  
H. A. Adler, W. H. Wickham, Commonwealth Edison Com-  
pany; M. S. Oldacre, Utilities Research Commission.

48-308. Performance of Dust-Contaminated Insulators in Fog. Bradley  
Cozzens, T. M. Blakeslee, Water and Power Department, City  
of Los Angeles.

48-255. Insulator Surface Contamination. H. A. Frey, Locke, Incor-  
porated.

## Thursday - cont'd.

48-259. Insulators to Withstand Airborne Deposits. J. J. Taylor, Ohio  
Brass Company.

### 9:30 a.m.—Symposium on Speed Regulating Systems for Sectional Paper Machine Drives

Club Room

G. W. KNAPP, Presiding

48-295. Electronic Speed Regulators for Sectional Paper Machine  
Drive. V. B. Baker, J. F. Kovalsky, Westinghouse Electric  
Corporation.

CP\* The Differential Interlock Regulating System for Sectional  
Paper Machine. J. L. Van Nort, Reliance Electric and Engi-  
neering Company.

CP\* The Electronic Amplidyne Regulating System for Sectional  
Paper Machine Drive. W. Mikelson, General Electric Company.

### 9:30 a.m.—Steel Mills

Parlor A

T. B. MONTGOMERY, Presiding

CP\* History of Development of Blooming Mill Drives. G. E. Stoltz,  
Westinghouse Electric Corporation.

48-271. The Reversing Cycle of Modern Blooming Mills. T. B. Mont-  
gomery, J. F. Sellers, Allis-Chalmers Manufacturing Company.

CP\* Auxiliary Drives for Blooming and Slabbing Mills—Selection  
of Motor Size and Gear Ratio. R. E. Marrs, S. H. Williamson,  
General Electric Company.

### 9:30 a.m.—Railroad Communications

Pere Marquette Room

E. W. KENEFAKE, Presiding

CP\* Railroad Communication Systems. G. L. Miller, New York  
Central Railroad.

48-315. Railroad Radio. W. D. Hailes, General Railway Signal Com-  
ACO.† pany.

CP\* Radiotelephone Service for Passengers Utilizing Bell System  
Highway Channels. Newton Monk, Bell Telephone Labora-  
tories, Inc.

### 9:30 a.m.—Carrier Current

Banquet Room

L. F. KENNEDY, Presiding

48-262. Carrier Channels for Telemetry T. D. Talmage, Tennes-  
see Valley Authority.

48-296. System Operation Improved with Carrier Telemetry and  
Load Control. A. W. Walton, Oklahoma Gas and Electric  
Company; H. W. Lensner, Westinghouse Electric Corporation.

48-297. Characteristics of New Carrier-Current Equipment for Tele-  
metry and Load Control. R. W. Beckwith, General Electric  
Company.

48-256. Coupling Capacitors and Traps for Rural Line Carrier. Carrier  
Current Committee.

48-257. Report on Method of Measurements at Carrier-Current Fre-  
quencies. Carrier Current Committee.

### 9:30 a.m.—Trip to A. O. Smith Corporation

### 1:30 p.m.—Trip to Allen-Bradley Company

## Thursday - cont'd.

**2:00 p.m.—Transmission, Distribution, and Outdoor Substation Design**

Crystal Ballroom

G. S. LUNGE and C. F. WAGNER, Presiding

- 48-319. Pole Fires Due to Insulator Contamination. W. H. Wickham, H. A. Adler, Commonwealth Edison Company; M. S. Oldacre, Utilities Research Commission.
- 48-285. Relative Surface Voltage Gradients of Grouped Conductors. M. Temoshok, General Electric Company.
- 48-298. Channels for Operation of Supervisory Control Equipment. W. A. Derr, M. J. Brown, Westinghouse Electric Corporation.
- 48-299. Design Considerations of Transmission Substations as Shown ACO.† by a recent Midwest Installation. A. H. Powell, L. D. Madson, General Electric Company.

**2:00 p.m.—Conference on Material Handling**

Banquet Room

E. M. HAYS, Presiding

- CP.\* Electric Truck Control Systems. D. I. Bohn, T. O. English, Aluminum Company of America.
- CP.\* Magnetorque A-C Crane Control. F. M. Blum, F. W. Wendelburg, Harnischfeger Corporation.

**2:00 p.m.—Land Transportation**

Pere Marquette Room

J. C. AYDELOTT, Presiding

- 48-300. Short-Time Ratings of Diesel-Electric Locomotives. D. R. Campbell, T. J. Woods, Westinghouse Electric Corporation.
- 48-301. The Present Competitive Position of Coal, Residual Oil, Diesel Oil, and Electricity As Energy Sources for Motive Power Operation in the Pacific Northwest. T. M. C. Martin, Bonneville Power Administration.
- 48-302. Head End Power on Railroad Passenger Trains. H. H. Hanft, ACO.† Westinghouse Electric Corporation.
- 48-303. Handling Suburban Traffic on Steam Railroads. M. L. Sloman, Westinghouse Electric Corporation.

**7:30 p.m.—Milwaukee Gemuetlichkeit, Sports, etc.**

## Friday, October 22

**9:00 a.m.—Switchgear**

Crystal Ballroom

F. A. LANE, Presiding

- 48-258. Simplified Calculation of Fault Currents. Working Group, Switchgear Committee.
- 48-248. A New Outdoor Air Switch and a New Concept of Contact Performance. S. C. Killian, Delta-Star Electric Company.
- 48-304. High-Speed Reclosing of Power Circuit Breakers from a ACO.† Manufacturer's Point of View. H. B. Ashenden, Allis-Chalmers Manufacturing Company.
- 48-305. Large Indoor Power Air Blast Breakers. G. E. Jansson, Allis-Chalmers Manufacturing Company.
- 48-306. Metal-Clad Switchgear with Air Blast Breakers. A. Ewy, Allis-ACO.† Chalmers Manufacturing Company.
- 48-288. An Air Operated Interrupter Switch applied to Arc-Furnace ACO.† Duty Up to 15 Kv. J. H. Michael, T. G. Bank, Allis-Chalmers Manufacturing Company.

## Friday - cont'd.

**9:30 a.m.—Conference on Automatic Contouring for Machine Tools**

Banquet Room

W. B. WIGTON, Presiding

General Paper:

- CP.\* Fundamentals of Machine Tool Contouring Systems. J. M. Delfs, General Electric Company.

Individual Papers by: J. J. Jaeger, Pratt and Whitney Company

R. E. Schutte, Barber Colman Company

W. O. Osborn, Westinghouse Electric Corporation

R. D. McComb, General Electric Company

**9:30 a.m.—Switching Systems**

Club Room

A. E. FROST, Presiding

- 48-312. Relay Preference Lockout Circuits in Telephone Switching. A. E. Joel, Jr., Bell Telephone Laboratories, Inc.
- CP.\* The 7-J Rotary Telephone Switching Exchange. R. W. Engsborg, Federal Telephone and Radio Corporation.
- 48-251. Military Teletypewriter Systems of World War II. F. J. Singer, Bell Telephone Laboratories, Inc.
- 48-317. Push-Button Switching in Telegraph Systems. R. F. Blanchard, W. B. Blanton, Western Union Telegraph Company.

**9:30 a.m.—Joint Conference on Education and Student Branches**

Pere Marquette Room

H. N. MULLER, Presiding

- CP.\* Career Breadth in Engineering. T. G. LeClair, Commonwealth Edison Company.
- CP.\* Unsolved Problems in the Power Field. A. C. Monteith, Westinghouse Electric Corporation.
- CP.\* Career Opportunities in the Utility Field. F. E. Sanford, Copper Wire Engineering Association.
- CP.\* Better Methods and Stimulation of Teaching in the Power Field. E. W. Boehne, Massachusetts Institute of Technology.

**9:30 a.m.—Trip to Liquid-Cooled Alternator at Milwaukee School of Engineering**

**2:00 p.m.—Relays**

Club Room

W. R. BROWNLEE, Presiding

- 48-309. Voltage Surges in Relay Control Circuits. T. R. Halman, L. K. Harris, Detroit Edison Company.
- 48-310. Electronic Protective Relays. R. H. Macpherson, A. R. VanC. Warrington, A. J. McConnell, General Electric Company.
- 48-260. A New Distance Ground Relay. S. L. Goldsborough, Westinghouse Electric Corporation.
- 48-311. Instantaneous Bus-Differential Protection Using Bushing Current Transformers. H. T. Seeley, General Electric Company; Frank von Roeschlaub, Ebasco Services, Inc.

## Friday - contd.

### 2:00 p.m.—Conference on Automatic Contouring for Machine Tools—continued

**Banquet Room**  
**W. B. WIGTON, Presiding**

Papers by: C. L. Calosi, Raytheon Manufacturing Company  
 P. M. Sampatacos, Consultant  
 A. H. Dall, Cincinnati Milling Machine Company  
 F. Fritsch and C. M. Griffin, Lodge and Shipley Company  
 Nagle Gusching, Monarch Machine Tool Company

### 2:00 p.m.—Radio on Great Lakes

**Pere Marquette Room**  
**E. W. KENEFAKE, Presiding**

48-316. The Great Lakes Radiotelephone System. R. H. Herrick, The ACO.† Lorain County Radio Corporation.  
 CP.\* The Organization and Administration of Wide-Area Servicing Activities. W. A. Goodell, Lorain County Radio Corporation.  
 CP.\* Operational Requirements for VHF Equipment. C. M. Jansky, Jr., Jansky and Bailey, Consulting Engineers.  
 CP.\* Three and Ten Centimeter Commercial Marine Radar. E. C. Kluender, General Electric Company.

### MEETING FEATURES

**THE STAG-SMOKER** will be held at 6:30 p.m., Tuesday, October 19 in the Fern Room of the Hotel Pfister. This event will consist of an excellent dinner and entertainment. A good orchestra and high quality acts following the dinner have been engaged. Tickets will be \$4.00 per plate. Please make reservations early and purchase tickets at the Special Reservation Desk to facilitate arrangements. Tickets will not be assigned to specific tables.

**INDUSTRIAL HEATING LUNCHEON** Wednesday, October 20, 12:30 p.m.—A luncheon has been arranged to commemorate the 10th Anniversary of Industrial Infrared Heating originally developed at the River Rouge Plant of the Ford Motor Company in Dearborn, Michigan. Anyone interested in industrial heating is invited to attend this luncheon. Tickets will be on sale at the Registration Desk.

**THE BANQUET AND DANCE**, dress informal, will be held at 6:30 p.m., Wednesday, October 20, in the Chrystal Room of the Hotel Schroeder. The program of dance music will be varied to provide dances for all. Tickets will be \$4.00 per plate. Please make reservations early and purchase tickets at the Special Registration Desk to facilitate arrangements.

**MILWAUKEE GEMUETLICHKEIT** is scheduled for 7:30 p.m. on Thursday, October 21 in Lynn Hall of the Allen-Bradley Company, 136 West Greenfield Avenue. The committee has scheduled an evening of informal entertainment including championship athletic exhibitions, movies, card games, and refreshments. There will be plenty of chairs to sit down and visit with your friends. There will be no charge for tickets, but reservations in advance will assist the committee in estimating the attendance and accommodations necessary. Tickets will be available at the Special Registration Desk.

### Theatre and Broadcast Tickets

Tickets for current theatrical productions and broadcasts may be obtained through the Special Registration Department, and information regarding the names of shows, ticket prices, theatre locations, etc., may be obtained from this department. These tickets should be obtained promptly, as tickets remaining unsold will be returned to the theatre for refund the day before the performance.

## SPORTS

Golf enthusiasts will have an opportunity to have Lunch followed by an afternoon of golf on Tuesday, October 19th at the North Hills Country Club.

This Club, embracing a well groomed 18 hole golf course, is situated about 15 miles northwest of Milwaukee on highway U. S. 41.

It is a picturesque and interesting par 72 wooded layout nestled in gentle rolling terrain. The beauty of this 6,288 yard course is further enhanced as the Menomonee River winds its way across the grounds and contributes largely in the creation of some very unusual golf holes. Each nine holes is virtually horse-shoe shaped with the incoming nine encircling the other, and its unique arrangement affords play at any time in the afternoon without encountering the sun's blinding rays.

North Hills' imposing clubhouse has been greatly enlarged and remodeled this year and proudly offers to guests its modern facilities. Here good food, refreshments and comfort may be enjoyed while viewing the golf course through its facade of many picture windows in a setting unequalled in this area. An afternoon in this genial and pastoral atmosphere should not be overlooked by golf enthusiasts.

### LADIES' PROGRAM

A well-planned program has been arranged by the Ladies' Committee to assure a pleasant and interesting stay in Milwaukee. The program schedule is as follows:

#### Monday, October 18

"Get-Acquainted Day." Hostess parlor open.  
 Tea will be served during the afternoon.  
 Evening—wives join husbands for brewery trips.

#### Tuesday, October 19

Tour of Phoenix Hosiery Co. at 9:00 a.m.  
 Afternoon—Tour of city, followed by Tea at the Milwaukee Engineers' Society building.  
 Evening—Informal dinner with Ednah Nichols giving her demonstration on remodeling and trimming hats.

#### Wednesday, October 20

Luncheon and Style Show at Milwaukee Country Club.  
 Evening—Dinner Dance.

#### Thursday, October 21

Bridge Luncheon at Milwaukee Athletic Club.

#### Friday, October 22

Hostess parlor will remain open.  
 No planned entertainment.

Hostess parlors will be open during the entire meeting. Ladies of the local committee will be present at all times to arrange card games and give information on shopping centers, theatres, and points of interest.

### INSPECTION TRIPS

**The Harnischfeger Corporation**, located at 4400 W. National Avenue, is the foremost builder of materials handling equipment in the country. Builders of overhead traveling cranes, gantry cranes, monorail hoists, crawler cranes, and power shovels. Also are manufactured considerable electrical equipment in the lines of motors, control, brakes, and electric welding equipment. During this shop tour,



the manufacture and assembly of overhead traveling cranes will be viewed as well as a demonstration of an actual crane equipped with a magnetorque control, all as outlined in a paper presented before the AIEE. In addition all electric power shovels will be shown in various stages of assembly as well as a tour of P&H's Electrical Division showing motors, brakes, and control as well as electric welding machines in assembly and final test.

**The Blatz Brewing Company's** modernistic guest auditorium, to be visited Monday evening, occupies the northeast corner of the streamlined bottling plant. Deep leather chairs add an extra touch of comfort to the tap room. In the auditorium itself, fluted walnut paneling from floor to ceiling, extends from either side of the ample stage.

**The Pabst Brewing Company**, which may be visited Monday evening, was founded in 1844 and is two years older than Milwaukee itself. From a capacity of a few hundred barrels yearly, this plant produces more than 3,000,000 barrels. The plant has produced a variety of products and during World War II malt barley was furnished for the Government's alcohol production program which was so vital to the manufacture of synthetic rubber and smokeless powder.

**The Joseph Schlitz Brewing Company** which also may be visited Monday evening is the largest single establishment in the United States devoted exclusively to the brewing of beer.

**For 56 years Cutler-Hammer, Inc.**, pioneer electrical manufacturers, have furnished dependable control equipment to meet the ever increasing needs of American industry and commerce. Their products are used in such basic industries as steel, automotive, textile, oil refining, rubber and food . . . for resale on machine tools, electric stoves, water heaters, pumps, saws and machinery of all kinds . . . on bridges, locks and dams . . . on ships, planes and trains . . . in homes, offices and factories. Today more than 5000 people are employed in four Milwaukee plants. On the tour of the company's centrally located main plant, visitors will have an opportunity to see world famous Cutler-Hammer Motor Control being assembled.

**The Allis-Chalmers Manufacturing Company** will be host to an inspection trip on Tuesday. After luncheon at the Allis-Chalmers Club House visitors may see a variety of products in fabrication, farm tractors, hydraulic turbines and generators, steam turbine-generator equipment, transformers, unit substations, switchgear, voltage regulators, and etc.

**Visitors to the Square D Company** will see the manufacture of products of the industrial controller division including automatic motor starters, resistance welder controls, heavy duty d-c controls for steel mill use, and automatic pressure switches.

#### Visitors to Globe-Union will see —

— highly mechanized, mass production of "famous name" storage batteries. This is the home plant of Globe-Union's nine plants located throughout the United States. Here all new equipment and designs are tested and proven.

— complete, high volume production of automotive spark plugs from the steel bar stock and raw ceramic talc to packaged units and the newest in electro-plating and assembly equipment for the production of packaged, "ready to wear" roller skates directly from strip steel.

— the production of steatitic ceramics from raw talc to finished insulators, of the highest dielectric capacitor ceramics commercially produced in the world today, of ceramic filters fine enough to remove bacteria from liquids, and of custom ceramics to withstand heat and heat shock surpassing the performance of quartz or steel.

— transmitting and receiving radio stations that may be carried in your pocket and how the much discussed printed circuits used in them are made and tested.

— the electrical laboratories for the development and the production control of small electronic components such as temperature compensating ceramic capacitors, printed electronic circuits, ceramic trimmer capacitors, variable resistors and selector switches of all types.

**The A. O. Smith Corporation Plant Tour** will last about two and a half hours. It will include visits to the semi-automatic frame plant, the pipe mill, the vessel shop, several laboratories and the company's exhibit hall. In these various plants one will see assembly of automobile frames, fabrication of large diameter steel pipe, manufacture of glass-lined storage tanks, oil refining vessels and chemical equipment. A discussion period is planned following the tour, when members will have an opportunity to question engineers and research men.

**The Allen-Bradley Plant**, well known for its industrial controls with a major output in the form of solenoid switches for across-the-line starters, reversing switches, and multispeed motor controls of various types, will be visited on Thursday. Here good working conditions, good equipment, good supervision converge to produce a standard of quality in motor control and radio resistors which is unique in their respective fields. In addition to the design and manufacture of special tools, this company develops and produces many special machines for its manufacturing departments.

**The Hydraulic Model Of A Liquid-Cooled Turbo-Generator Rotor** demonstrates that very large thermal gains may be effected by using a liquid instead of a gas as a cooling medium. The mechanical difficulties associated with liquid cooling of a turbo-generator rotor have been overcome by C. J. Fechheimer. In the model, 55 gallons of water flow with the rotor running at 3560 rpm, which is sufficient for a 50,000-kva rotor with only 14-degrees F. rise for the water. The model may be seen in operation at the Milwaukee School of Engineering, 1020 North Broadway.

#### RESTAURANTS

Excellent food, excellently prepared, is the specialty of the restaurants and hotel dining rooms in Milwaukee. However, some of the places are noted for features a bit extraordinary—such as—

**AMBROSIA HOUSE**—all vegetarian meals prepared and served in a quiet and refined colonial atmosphere.

**CAPE COD INN**—nautical surroundings, and sea food that rivals the Cape itself.

**CHINA CUPBOARD**—overlooking the Milwaukee harbor, this friendly eating spot offers prompt service and a variety of tempting dishes.

**JOE DEUTSCH'S CAFE**—where steaks and chops are served in old Milwaukee style.

**EUGENE'S**—in the Hotel Juneau overlooking Lake Michigan, where the traditionally good sea food has a national reputation.

**FRITZ GUST**—featuring famous German dishes—recipes other chefs have been trying to learn for years.

**MADER'S**—for Milwaukee Gemuetlichkeit and German style cooking, this is the last of the city's famous Old World restaurants of yesteryear

**KARL RATZSCH'S**—a string quartet completes the romantic Viennese setting where fine food is the rule.

**SCHWABEN-HOF**—more European dishes with entertainment and atmosphere in the Tyrolean vein.

**ITALIAN VILLAGE**—Italian setting offering unusually good food with a Latin flavor.

**CHALET**—superb food prepared as you like it and served in a beautiful dining room overlooking the lake.

**FOX AND HOUNDS**—a quaint Early-American inn outside the city for choice aged steaks, Southern fried chicken and roast country duck.

These are only a few of the many fine eating places in the Milwaukee area.

# American Institute of Electrical Engineers

## ENTERTAINMENT

On Monday, October 18, Pierre Monteux will conduct the Chicago Symphony Orchestra at the Pabst Theatre. This concert opens the 1948-9 season for the Chicago Symphony Orchestra at Milwaukee. Pierre Monteux, the most famous of contemporary French conductors, has been permanent director of the San Francisco Symphony Orchestra for the past nine years.

On Tuesday, October 19, Harold Kreutzberg, male dancer, will also perform at the Pabst Theatre. "The greatest male dancer since Nijinsky" according to Time Magazine. The unique performance and versatility of this dancer will be evidenced in a program ranging from the droll to the dramatic, providing a scintillating evening of extraordinary entertainment.

At the Davidson Theatre one may see legitimate stage productions, the schedule of which was not available at the time this program was printed.

## MIDWEST GENERAL MEETING COMMITTEE

E. W. Seeger, <i>Chairman</i>	E. F. Meikelburg, <i>Secretary</i>	
E. U. Lassen, <i>Vice-Chairman</i>	J. A. Potts, <i>Treasurer</i>	
L. C. Aicher	E. H. Davies	A. J. Krupy
M. A. Baker	T. G. Glenn	R. Neighboubs
K. R. Brown	F. C. Holtz	J. C. Strasbourger
C. C. Crane	J. H. Kuhlman	

### Committee Chairmen

<i>Technical Program</i>	<i>Sports</i>	<i>Finance</i>
W. Richter	W. O. Helwig	F. W. Bush
<i>Inspection Trips</i>	<i>Transportation</i>	<i>Ladies</i>
E. J. Limpel	E. M. Plettner	Mrs. E. L. McClure
		Mrs. E. W. Seeger
<i>Entertainment</i>	<i>Publicity</i>	<i>Registration &amp; Housing</i>
B. F. Tellkamp	E. T. Sherwood	R. Earle

### Subcommittee Chairmen

<i>Equipment</i>	<i>Hotels</i>	<i>Registration</i>
G. Hutchinson	M. M. Iglehart	C. H. Krueger

## COMMITTEE MEETINGS

### Monday, October 18

2:00 p.m.—Planning and Coordination	Parlor G
8:00 p.m.—Power Coordinating	Parlor C

### Tuesday, October 19

6:30 a.m.—Industry Coordinating	Parlor F
9:30 a.m.—Board of Directors	University Club

### Wednesday, October 20

7:00 a.m.—Industrial Control	Parlor B
8:00 a.m.—Electric Heating Authors Breakfast	Parlor E
9:30 a.m.—Power Generation	Parlor B
9:30 a.m.—Substation	Parlor I
9:30 a.m.—Transmission and Distribution	Parlor C
9:30 a.m.—Education	Parlor G
10:30 a.m.—System Engineering	Parlor D
2:00 p.m.—Carrier Current	Parlor G
2:30 p.m.—Basic Sciences	Parlor D

### Thursday, October 21

9:30 a.m.—Registration of Engineers	Parlor G
9:30 a.m.—Communication & Science Coordinating	Parlor F
9:30 a.m.—Transformer Subcommittee	Parlor B
9:30 a.m.—Technical Activities Subcom.	Parlor I
2:00 p.m.—Subcomm. on Appl. of Probability Methods to Power Sys. Problems	Parlor F
2:30 p.m.—Student Branches	Parlor G